

CLAIMS

What is claimed is:

- 5 1. In a data communications device, a method for providing access to data from a data access device to a client over a network, the method comprising the steps of:
- receiving a first request from a client to access data;
- providing a second request to access data to the data access device in response to receiving the first request, the second request including connection
- 10 establishment information that enables establishment of a communication connection between the data access device and the client;
- receiving a first response from the data access device; and
- providing a data transfer approval to the data access device in response to receiving the first response, the data transfer approval authorizing the data access
- 15 device to establish the communication connection to the client based on the connection establishment information and provide a second response to the second request to the client.
2. The method of claim 1, wherein
- 20 the step of receiving the first request includes (i) receiving the first request based on a request/response communications protocol, and (ii) receiving a content identifier that identifies a requested content; and
- the step of providing the second request includes providing the content identifier to enable the data access device to access the requested content.

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3. The method of claim 1, wherein
- the step of receiving the first request comprises receiving a plurality of first requests to access data from the client;
- the step of providing the second request comprises providing a plurality of second requests in response to receiving the first requests, each second request including a request sequence number; and
- the step of providing the data transfer approval comprises providing a data transfer approval for each of a plurality of responses to the second requests in a sequence based on the request sequence numbers for the second requests.
4. The method of claim 1, wherein
- the step of providing the second request comprises providing a plurality of second requests to a plurality of data access devices;
- the step of receiving the first response comprises receiving a plurality of first responses from a subset of the plurality of data access devices that received the second requests; and
- the step of providing the data transfer approval comprises a step of selecting one of the subset of data access devices to provide the second response to the second request and providing the data transfer approval to the selected one of the data access devices.
5. The method of claim 4, wherein each first response includes usage information for each data access device in the subset that indicates a level of usage for each data access device in the subset; and
- the step of selecting one of the subset comprises comparing the usage information for all of the data access devices in the subset to determine the selected one of the data access devices from the subset having a preferable level of usage.

6. The method of claim 1, wherein the connection establishment information includes a current transmit window for the client that provides a window length for transmitting the second response to the client from the data access device, the window length provided by the client in the first request for use by the data access device when determining a quantity of data to provide in the second response.
7. The method of claim 1, wherein the data access device is a first data access device, and the connection establishment information includes a location identifier for a second data access device suitable for use if a requested content specified in the first request is unavailable from the first data access device.
8. The method of claim 1, wherein the connection establishment information is a first set of connection establishment information, and the data transfer approval includes a second set of connection establishment information, the data transfer approval authorizing the data access device to establish the communication connection to the client based on the first set and the second set of connection establishment information.
9. The method of claim 1, further comprising the steps of:
- receiving a first acknowledgment from the client of the second response provided to the client from the data access device over the communication connection; and
 - in response to receiving the first acknowledgment, forwarding a second acknowledgment to the data access device indicating that the data communications device received the first acknowledgment from the client.

10. The method of claim 1, further comprising the steps of:
 - receiving a first termination signal from the data access device in order to terminate a request session with the client; and
 - in response to receiving the first termination signal, providing a second
- 5 termination signal to the client that indicates a request to terminate the request session.

11. A data communications device for providing access to data from a data access device to a client over a network, the data communications device comprising:
- a processor;
 - a memory coupled to the processor; and
 - a communications interface connected to the processor and the memory:
- wherein the memory is encoded with logic instructions for a data communication manager application that, when performed on the processor, cause the processor to form a data communication manager that manages the access to data stored in the data access device by performing the operations of:
- receiving a first request through the communications interface from a client to access data;
 - providing a second request to access data through the communications interface to the data access device in response to receiving the first request, the second request including connection establishment information that enables establishment of a communication connection between the data access device and the client;
 - receiving a first response through the communications interface from the data access device; and
 - providing a data transfer approval through the communications interface to the data access device in response to receiving the first response, the data transfer approval authorizing the data access device to establish the communication connection through the communications interface to the client based on the connection establishment information and provide a second response to the second request to the client.

12. The data communications device of claim 11, wherein the logic instructions for the data communication manager application comprise further logic instructions that, when performed on the processor, cause the data communication manager to perform the operations of:
- 5 receiving the first request based on a request/response communications protocol,
- receiving a content identifier that identifies a requested content; and
- providing the content identifier to enable the data access device to access the requested content.
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13. The data communications device of claim 11, wherein the logic instructions for the data communication manager application comprise further logic instructions that, when performed on the processor, cause the data communication manager to perform the operations of:
- 15 receiving a plurality of first requests to access data from the client;
- providing a plurality of second requests in response to receiving the first requests, each second request including a request sequence number; and
- providing a data transfer approval for each of a plurality of responses to the second requests in a sequence based on the request sequence numbers for the
- 20 second requests.

14. The data communications device of claim 11, wherein the logic instructions for the data communication manager application comprise further logic instructions that, when performed on the processor, cause the data communication manager to perform the operations of:
- 5 providing a plurality of second requests to a plurality of data access devices;
- receiving a plurality of first responses from a subset of the plurality of data access devices that received the second requests; and
- selecting one of the subset of data access devices to provide the second
- 10 response to the second request and providing the data transfer approval to the selected one of the data access devices.
15. The data communications device of claim 14, wherein each first response includes
- 15 usage information for each data access device in the subset that indicates a level of usage for each data access device in the subset; and
- wherein the logic instructions for the data communication manager application comprise further logic instructions that, when performed on the processor, cause the data communication manager to perform the operation of
- comparing the usage information for all of the data access devices in the subset to
- 20 determine the selected one of the data access devices from the subset having a preferable level of usage.
16. The data communications device of claim 11, wherein the connection
- 25 establishment information includes a current transmit window for the client that provides a window length for transmitting the second response to the client from the data access device, the window length provided by the client in the first request for use by the data access device when determining a quantity of data to provide in the second response.

17. The data communications device of claim 11, wherein the data access device is a first data access device, and the connection establishment information includes a location identifier for a second data access device suitable for use if a requested content specified in the first request is unavailable from the first data access device.
18. The data communications device of claim 11, wherein the connection establishment information is a first set of connection establishment information, and the data transfer approval includes a second set of connection establishment information, the data transfer approval authorizing the data access device to establish the communication connection to the client based on the first set and the second set of connection establishment information.
19. The data communications device of claim 11, wherein the logic instructions for the data communication manager application comprise further logic instructions that, when performed on the processor, cause the data communication manager to perform the operations of:
- receiving a first acknowledgment through the communications interface from the client of the second response provided to the client from the data access device over the communication connection; and
 - in response to receiving the first acknowledgment, forwarding a second acknowledgment through the communications interface to the data access device indicating that the data communications device received the first acknowledgment from the client.

20. The data communications device of claim 21, wherein the logic instructions for the data communication manager application comprise further logic instructions that, when performed on the processor, cause the data communication manager to perform the operations of:
- 5 receiving a first termination signal through the communications interface from the data access device in order to terminate a request session with the client; and
- in response to receiving the first termination signal, providing a second termination signal through the communications interface to the client that
- 10 indicates a request to terminate the request session.
21. A computer program product that includes a computer readable medium having instructions stored thereon for providing access to data from a data access device to a client over a network, such that the instructions, when carried out by a data
- 15 communications device, cause the data communications device to perform the steps of:
- receiving a first request from a client to access data;
- providing a second request to access data to the data access device in response to receiving the first request, the second request including connection
- 20 establishment information that enables establishment of a communication connection between the data access device and the client,
- receiving a first response from the data access device; and
- providing a data transfer approval to the data access device in response to receiving the first response, the data transfer approval authorizing the data access
- 25 device to establish the communication connection to the client based on the connection establishment information and provide a second response to the second request to the client.

22. A data communications device for providing access to data from a data access device to a client over a network, the data communications device comprising:
- means for receiving a first request from a client to access data;
 - means for providing a second request to access data to the data access device in response to receiving the first request, the second request including connection establishment information that enables establishment of a communication connection between the data access device and the client,
 - means for receiving a first response from the data access device;
 - and
 - means for providing a data transfer approval to the data access device in response to receiving the first response, the data transfer approval authorizing the data access device to establish the communication connection to the client based on the connection establishment information and provide a second response to the second request to the client.

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23. In a data access device, a method for providing data over a network to a client, the method comprising the steps of:
- 5 receiving a second request to access data from a data communications device, the second request based on a first request to access data received by the data communications device from the client and the second request including connection establishment information that enables establishment of a communications connection between the data access device and the client;
- 10 providing a first response to the data communications device; and receiving a data transfer approval from the data communications device in response to providing the first response, the data transfer approval authorizing the data access device to establish the communication connection to the client and to provide a second response to the second request to the client based on the connection establishment information.
- 15 24. The method of claim 23, wherein the step of receiving the second request includes receiving a content identifier that identifies a requested content and that enables the data access device to access the requested content.
- 20 25. The method of claim 23, wherein the connection establishment information includes a current transmit window for the client that provides a window length for transmitting the second response to the client, the window length provided by the client in the first request for use by the data access device when determining a quantity of data to provide in the second response.
- 25 26. The method of claim 23, wherein the data access device is a first data access device, and the connection establishment information includes a location identifier for a second data access device suitable for use if a requested content specified in the first request is unavailable from the first data access device.

27. The method of claim 23, wherein the connection establishment information is a first set of connection establishment information, and the data transfer approval includes a second set of connection establishment information, the data transfer approval authorizing the data access device to establish the communication connection to the client based on the first set and the second set of connection establishment information.
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28. The method of claim 23, further comprising the steps of establishing the communication connection to the client and providing the second response to the second request to the client over the communication connection.
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29. A data access device for providing data to a client, the data access device comprising:
- a processor;
 - a memory coupled to the processor; and
 - a communications interface connected to the processor and the memory;
- wherein the memory is encoded with logic instructions for a data access manager application that, when performed on the processor, cause the processor to form a data access manager that provides data to the client by performing the operations of:
- receiving a second request to access data through the communications interface from a data communications device, the second request based on a first request to access data received by the data communications device from the client and the second request including connection establishment information that enables establishment of a communications connection between the data access device and the client;
 - providing a first response through the communications interface to the data communications device; and
 - receiving a data transfer approval through the communications interface from the data communications device in response to providing the first response, the data transfer approval authorizing the data access device to establish the communication connection through the communications interface to the client and to provide a second response to the second request to the client based on the connection establishment information.

30. The data access device of claim 29, wherein the logic instructions for the data access manager application comprise further logic instructions that, when performed on the processor, cause the data access manager to perform the operation of receiving a content identifier that identifies a requested content and that enables the data access device to access the requested content.
31. The data access device of claim 29, wherein the connection establishment information includes a current transmit window for the client that provides a window length for transmitting the second response to the client, the window length provided by the client in the first request for use by the data access device when determining a quantity of data to provide in the second response.
32. The data access device of claim 29, wherein the data access device is a first data access device, and the connection establishment information includes a location identifier for a second data access device suitable for use if a requested content specified in the first request is unavailable from the first data access device.
33. The data access device of claim 29, wherein the connection establishment information is a first set of connection establishment information, and the data transfer approval includes a second set of connection establishment information, the data transfer approval authorizing the data access device to establish the communication connection to the client based on the first set and the second set of connection establishment information.

34. The data access device of claim 29, wherein the logic instructions for the data access manager application comprise further logic instructions that, when performed on the processor, cause the data access manager to perform the operations of establishing the communication connection through the communications interface to the client and providing the second response to the second request to the client over the communication connection.
35. A computer program product that includes a computer readable medium having instructions stored thereon for providing data over a network to a client, such that the instructions, when carried out by a data access device cause the data access device to perform the steps of:
- receiving a second request to access data from a data communications device, the second request based on a first request to access data received by the data communications device from the client and the second request including connection establishment information that enables establishment of a communications connection between the data access device and the client;
 - providing a first response to the data communications device; and
 - receiving a data transfer approval from the data communications device in response to providing the first response, the data transfer approval authorizing the data access device to establish the communication connection to the client and to provide a second response to the second request to the client based on the connection establishment information.

36. A data access device for providing data to a client, the data access device comprising:

means for receiving a second request to access data from a data communications device, the second request based on a first request to access data received by the data communications device from the client and the second request including connection establishment information that enables establishment of a communications connection between the data access device and the client;

means for providing a first response to the data communications device;

and

means for receiving a data transfer approval from the data communications device in response to providing the first response, the data transfer approval authorizing the data access device to establish the communication connection to the client and to provide a second response to the second request to the client based on the connection establishment information.

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